

on the commissural face: oil-tubes solitary in the intervals, 2 on the commissural side: seed-face plane.—Oregon, John Day Valley, on high hill-tops, May, 1882 (*Howell* B in part), Lost Valley, June, 1882 (*Howell* 410). The fruit of this species, in its thickish involute wings and rather prominent commissural ridge, very nearly approaches that of *Orogenia fusiformis* Watson. Dedicated to L. F. Henderson, one of our best Oregon collectors.

Crawfordsville, Ind.

BRIEFER ARTICLES.

A date palm fungus (*Graphiola Phœnicis* Poit).—In the early part of 1887 this fungus was abundant on the fronds of the date palm in one of the conservatories of the United States Department of Agriculture, Washington, D. C. As it appeared again this spring with greater severity, and has been reported from other parts of the United States, it may be of interest to state briefly what is known concerning it, more particularly because its anomalous structure renders it a very interesting parasite.

This fungus appears indifferently on either side of the frond or axis in the form of small, roundish, sub-epidermal swellings, scattered or contiguous, which finally rupture the epidermis and protrude as black spore-bodies. These are rarely more than 1 to 1.5 mm. in diameter by 0.5 mm. high, the base being somewhat broader than the apex. As these bodies mature they become crateriform and from their center projects a curious bundle of bright yellow filaments, several millimeters in length. Filling the bottom of this cavity and suspended between the filaments at this stage of growth are innumerable sulphur yellow spores which, when the fronds are shaken, fly off in a manner quite suggestive of diminutive showers of pine pollen. Most of these spore-bodies were very superficial, being confined exclusively to the epidermis, the deeper tissues of the frond being green quite up to the borders of the fungus and beneath it. In some instances, however, the deeper tissues also suffered, and in a very few they had become yellow for a distance of several millimeters, especially in the direction of the longer axis of the pinnæ, and particularly when the fruit bodies were clustered. On some fronds there were hundreds of these bodies, so that they had a fly-specked appearance. Other fronds upon the same plant appeared to be less affected, and some adjacent plants were entirely exempt.

According to Fischer, the black rim of the crater, the peridium, grows out of a hyphæ-complex, or pseudo-parenchymatous substratum, and consists of parallel hyphæ arranged nearly at right angles to the plane of the frond. These hyphæ are more or less branched, and are

united by a black exudate, soluble in various reagents. There is also a delicate inner peridium, quite apparent in some species of *Graphiola*, but not easily demonstrated in this one. The long yellow filaments are composed of parallel mycelial threads, each strand or filament containing fifty or more united into one body. From the pseudo-parenchymatous floor of the crater, between the bases of the yellow filaments, arise many elongated, unbranched or basally branched, colorless hyphæ, which constrict into nearly isodiametric cells. On the side wall of these cells the nascent spores appear in the form of buds, which enlarge, become separated from the mother cell, grow and subdivide after separation, to become finally the round or ellipsoidal, smooth-walled, one-celled or two-celled, mature spore. The nascent spores develop on the hyphæ basipetally. There are usually from three to six on each mother cell, and all of these mature at the same time. The mother cell often separates from the hyphæ along with the nascent spores, to which it remains attached for some time. The ripe spores are three to six millimeters in diameter, with a somewhat thick episporium, and a contents showing refractive particles. They germinate in water by the formation of a promycelium and sporidia or by the direct production of a germ-tube.

This fungus was first described by Fries, in 1823, as *Phacidium*. Many have since written upon it, but its structure, and probable affinity, were first clearly pointed out by Ed. Fischer in 1883. Its classification has been a mooted question, if, indeed, it be yet definitely settled. Fries, Kunze, Duby and Montagne placed it under Ascomycetes; Chevallier, Corda and Bonorden thought it belonged to Uredineæ; while Poiteau and Levillé looked upon it as one of the Myxomycetes. Fischer places it with the Ustilagineæ, or more strictly in a closely allied group under the name *Graphiolaceæ*. In general appearance, it must be confessed, it is not at all like the smuts, but it does not seem to be dimorphous, and it agrees pretty well with some of the smuts in the manner of spore-formation and mode of germination. In having a persistent mycelium in the form of a peridium it recalls *Dossansia*, *Sphacelotheca*, and similar aberrant forms of the Ustilagineæ, which, though perplexing to the systematist, are very interesting to the student of evolution.

After many failures Fischer succeeded in growing the fungus. The spores were sown in December on the immature fronds of a young palm, and the characteristic fungus spots first appeared in the following October.

Graphiola Phœnicis is very widely distributed. It occurs in India, Algiers, Egypt (?), Italy, Austria, Germany, Holland, Belgium, England, Scandinavia, French Guiana, and the United States.

It would be interesting to know to what extent this fungus occurs in the palm houses of this country. Dr. Farlow informs me that he has received it from several localities. The specimens collected by Ravenel in S. C., on *Chamærops*, and published in *Fungi Caroliniana*, Fasc. 4., No. 72,

as *G. Phoenicis*, either do not belong to this genus or are a distinct species, named provisionally *G. (?) compressa* Fisch.

The most important paper is *Beitrag zur Kenntniss der Gattung Graphiola*. Ed. Fischer, *Bot. Zeit.* 1883, Nos. 45, 46, 47 and 48.

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ERWIN F. SMITH.

Parasitic fungi of Missouri.—During the past five or six years the writer has devoted considerable attention to the fungi of Missouri, and during that time, with the assistance of Prof. S. M. Tracy and Rev. C. H. Demetrio, about 400 strictly parasitic species have been taken. Most of the species were taken in the central and southeastern parts of the state and, while no collections of importance were made in the western counties, late observations in these parts have convinced me that here the flora, so far as relates to fungi, is practically the same as that of the more carefully explored region. With very few exceptions, all of the species taken have been preserved either in my own herbarium or that of Mr. Demetrio.

Quite a number of the species have been distributed in Ellis' *North American Fungi* and Winter's *Fungi Europaei et Extra Europaei*. A careful list of all the species, together with their hosts, has lately been prepared, and as it now stands this list includes the following:

Uredineæ, 105 species, divided among the following genera: *Æcidium*, isolated forms, 41; *Cæoma*, 2; *Coleosporium*, 2; *Gymnosporangium*, 1; *Melampsora*, 4; *Peridermium*, 1; *Phragmidium*, 3; *Puccinia*, 33; *Ræstelia*, 2; *Uredo*, 2; *Uromyces*, 14.

Ustilagineæ, 16 species, divided as follows: *Doassansia*, 1; *Entyloma*, 3; *Tilletia*, 2; *Urocystis*, 1; *Ustilago*, 9.

I have several times collected a curious *Ustilago* upon *Polygonum Hydropiper*. The fungus attacks the flowers and greatly distorts them, producing in many cases large black globular swellings. This is probably the same form mentioned by Dr. Farlow (*BOT. GAZETTE*, viii, 277) as resembling *U. Bistortarum* (DC.). What appears to be the same thing has lately been issued in Dr. Winter's *Exsiccatae* under the name *U. Austro-Americana* Spez., from South America.

Peronosporæ, 17 species, distributed as follows: *Cystopus*, 5; *Peronospora*, 11; *Phytophthora*, 1.

Erysiphææ, 24 species, upon 47 hosts, as follows: *Erysiphe*, 3; *Microsphaera*, 8; *Phyllactinia*, 1; *Podosphaera*, 1; *Sphærotheca*, 5; *Uncinula*, 6.

Imperfect forms, nearly 200 species, so called, divided among the following genera: *Asterina*, *Cercospora*, *Cladosporium*, *Coniothyrium*, *Cylindrosporium*, *Diplodia*, *Entomosporium*, *Gleosporium*, *Ramularia*, *Septoria*, etc.

The remainder of the list, some 35 species or more, is made up of members of the following genera: *Epichloe*, *Leptosphaeria*, *Phyllachora*, *Sphaerella*, *Taphrinia*, etc.—B. T. GALLOWAY, *Washington, D. C.*

The black maple.—Last fall I contributed to an horticultural journal